

DOCUMENT-IDENTIFIER: US 5151390 A

TITLE: Silicon nitride-based fibers and composite material reinforced with fibers

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DEPR:

The number average molecular weight of the obtained polymer was 980, when measured by GPC (gel permeation chromatography). Then 5000 ml of 5% pyridine solution of the obtained perhydropolysilazane was charged in a 10 l stainless steel autoclave, to which 100 g of ammonia was added and stirred at 80.degree. C. for 3 hours to conduct a polycondensation reaction. The reaction product was allowed to cool and the gas was replaced with nitrogen.

The thus modified

perhydropolysilazane had a number average molecular weight of 2400 and a weight average molecular weight of 20000 (GPC method, polystyrene standard).

DEPR:

First, 5000 ml of the pyridine solution of the perhydropolysilazane prepared in Example 1 were charged in a pressure resistant reactor having an inner volume of 10 l and the reaction was continued with stirring under a closed nitrogen atmosphere at 120.degree. C. for 3 hours. During the reaction, a large amount of gas was generated to increase the pressure by 2.0 kg/cm.sup.2. The reaction mixture was allowed to cool to room temperature and the gas was replaced with nitrogen. The thus modified perhydropolysilazane had a number average molecular weight of 1950. To the solution, 900 ml of ethyl benzene was added and the solvent was vacuum distilled at 70.degree. C. to obtain white powders.

DEPR:

To 4000 ml of the filtrate containing perhydropolysilazane,  
was added 365.0 mg  
of polyethylene oxide (molecular weight 5.times.10.sup.6),  
and the whole  
vigorouslly stirred for 1 hour. Then the solvent was  
removed by vacuum  
distillation to obtain a spinning solution of 30 wt %  
perhydropolysilazane in  
pyridine. The spinning solution was filtered and degassed  
and then spun by a  
dry spinning method under a nitrogen atmosphere to obtain  
white fibers. The  
white fibers were dried under vacuum at 50.degree. C. for  
4 hours and heated  
under a nitrogen atmosphere at 100.degree. C. for 3 hours,  
under an ammonia  
atmosphere at 900.degree. C. for 1 hour, and then under a  
nitrogen atmosphere  
at 1050.degree. C. for 5 hours, to obtain inorganic  
silicon nitride-based  
fibers.